

What is claimed is:

1 1. A light emitting diode, comprising:

2 a ceramics substrate that has a high thermal
3 conductivity;

4 a light emitting element that is mounted on the ceramics
5 substrate; and

6 a radiation plate that is bonded to the back surface of
7 the ceramics substrate;

8 wherein the radiation plate contacts the ceramics
9 substrate at a contact region that includes a region of the back
10 surface of the ceramics substrate corresponding to a region of
11 the ceramics substrate on which the light emitting element is
12 mounted.

1 2. The light emitting diode according to claim 1, wherein:

2 the light emitting element is flip-chip mounted on the
3 ceramics substrate.

1 3. The light emitting diode according to claim 1, wherein:

2 the radiation plate is of a metal and is folded into
3 waveform outside the ceramics substrate.

1 4. The light emitting diode according to claim 1, wherein:

2 the radiation plate has a plurality of penetrating holes.

1 5. The light emitting diode according to claim 1, wherein:

2 the radiation plate is of a metal and is provided with
3 a plurality of radiation fins that are formed by making a cut

4 in the radiation plate and folding the inside portion of the
5 cut.

1 6. A light emitting diode array, comprising:

2 a ceramics substrate that has a high thermal
3 conductivity;

4 a light emitting element that is mounted on the ceramics
5 substrate; and

6 a radiation plate that is bonded to the back surface of
7 the ceramics substrate;

8 wherein the radiation plate contacts the ceramics
9 substrate at a contact region that includes a region of the back
10 surface of the ceramics substrate corresponding to a region of
11 the ceramics substrate on which the light emitting element is
12 mounted; and

13 a circuit board on which the plurality of light emitting
14 diodes are mounted, the circuit board including a through-hole.

1 7. A light emitting diode, comprising:

2 a circuit board that includes a plurality of penetrating
3 holes, each of which having a narrowed portion;

4 a ceramics substrate that is mounted on the circuit board
5 while bridging the narrowed portion, the ceramics substrate
6 having a high thermal conductivity;

7 a light emitting element that is mounted on a circuit
8 pattern of the ceramics substrate; and

9 a radiation plate that is bonded to the back surface of
10 the ceramics substrate and extends in one of the plurality of
11 penetrating holes without contacting the edge of the one of the

12 plurality of penetrating holes and;

13 wherein the circuit pattern of the ceramics substrate is
14 electrically connected to a circuit pattern of the circuit board
15 at the bridged narrowed portion.

1 8. A light emitting diode array, comprising a plurality
2 of the light emitting diodes defined in claim 7.

1 9. The light emitting diode according to claim 7, wherein:
2 the radiation plate has a plurality of penetrating holes.

1 10. The light emitting diode array according to claim 8,
2 wherein:
3 the radiation plate has a plurality of penetrating holes.

1 11. The light emitting diode according to claim 7,
2 wherein:
3 the radiation plate is of a metal and is provided with
4 a plurality of radiation fins that are formed by making a cut
5 in the radiation plate and folding the inside portion of the
6 cut.

1 12. The light emitting diode array according to claim 8,
2 wherein:
3 the radiation plate is of a metal and is provided with
4 a plurality of radiation fins that are formed by making a cut
5 in the radiation plate and folding the inside portion of the
6 cut.

1 13. A light emitting diode, comprising:
2 a substrate that has a low coefficient of thermal
3 expansion and a high thermal resistance;
4 a circuit pattern that is formed using a conductive
5 material on the substrate;
6 a light emitting element that is mounted on the surface
7 of the substrate;
8 a metal member that electrically connects the light
9 emitting element to the circuit pattern;
10 a glass lens that covers the periphery of the light
11 emitting element while leaving a space and a resin injection
12 hole, the space being defined to house the light emitting
13 element and the metal member;
14 a sealing material that seals the surface of the substrate
15 and the glass lens; and
16 light transmitting resin that is filled in the space by
17 injecting the resin through the resin injection hole.

1 14. The light emitting diode according to claim 13,
2 wherein:
3 the sealing material has a coefficient of thermal
4 expansion between the substrate and the glass lens.

1 15. The light emitting diode according to claim 13,
2 wherein:
3 the sealing material is of sealing glass.

1 16. The light emitting diode according to claim 13,
2 wherein:

3 the light transmitting resin is transparent silicone
4 resin.

1 17. The light emitting diode according to claim 13,
2 wherein:

3 the substrate has a resin injection hole that penetrates
4 through the substrate and communicates with the space, instead
5 of the resin injection hole defined by the glass lens.